

Second Five-Year Review Report

for

Northwestern States Portland Cement Company

Cerro Gordo County, Iowa

September 2002

PREPARED BY:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

Approved by:

Date:



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9-16-02

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List of Acronyms

ARARs	applicable or relevant and appropriate requirements
ATSDR	Agency for Toxic Substances and Disease Registry
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CKD	cement kiln dust
EPA	United States Environmental Protection Agency
IDNR	Iowa Department of Natural Resources
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
mg/l	milligram per liter
NCP	National Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NWSPCC	Northwestern States Portland Cement Company
O&M	Operation and Maintenance
pH	potential of Hydrogen
ROD	Record of Decision
RA	Remedial Action
RAOs	Remedial Action Objectives
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
RCRA	Resource Conservation Recovery Act
TDS	total dissolved solids
TSS	total suspended solids
µg/l	microgram per liter

Executive Summary

The Northwestern States Portland Cement Company Superfund site (Site) is located on a portion of the Holcim (US) Inc. cement manufacturing facility which is located north of Mason City, Iowa. The area where the contamination is located is known as the West Quarry. The remedy for the Site included capping of the West Quarry and construction of a drainage system to minimize water infiltration; installation of dewatering wells and a treatment system to treat the contaminated groundwater before discharging to nearby Calmus Creek; and groundwater monitoring to confirm the effectiveness of these actions. The Site achieved construction completion with the signing of the Preliminary Closeout Report on December 23, 1993. The Site was deleted from the National Priorities List on August 31, 1995. The trigger for this five-year review was the signing of the First Five-Year Review Report on June 25, 1997.

The determination that has been made during this five-year review is that the remedy continues to function as designed. The immediate threats have been addressed and the remedy continues to be protective.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Northwestern States Portland Cement Company		
EPA ID (from WasteLAN): IAD980852461		
Region: 7	State: IA	City/County: Mason City/Cerro Gordo County
SITE STATUS		
NPL status: <input type="checkbox"/> Final <input checked="" type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: 12/23/1993	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Diana L. Engeman		
Author title: Remedial Project Manager	Author affiliation: U.S. EPA - Region 7	
Review period:** 11/5/2001 to 9/16/2002		
Date of site inspection: 4/25/2002		
Type of review: <div style="text-align: right; margin-top: 10px;"> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion </div>		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Other (specify) _____ </div> <div> <input type="checkbox"/> Actual RA Start at OU# _____ <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> </div>		
Triggering action date (from WasteLAN): 6/25/1997		
Due date (five years after triggering action date): 6/25/2002		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

Schedule for future groundwater monitoring needs to be determined.

Request by Holcim to abandon monitoring wells HOL-MW2A, HOL-MW2C, and HOL-MC11B.

Request by Holcim to discontinue analysis of groundwater samples for metals.

Request by Holcim to discontinue analysis of groundwater samples for phenols.

Recommendations and Follow-up Actions:

Groundwater monitoring will be conducted once annually pursuant to the Statement of Work attached to the Consent Decree.

Monitoring wells HOL-MW2A, HOL-MW2C, and HOL-MW11B may be properly abandoned.

Metals analysis may be discontinued at HOL-MW1B, HOL-MW2CR, HOL-MW4, HOL-MW5A, HOL-MW5B, HOL-MW8, HOL-MW9, HOL-MW11A, and HOL-MW12.

There will be no change in the requirement to analyze for phenols at all monitoring wells.

Protectiveness Statement: The remedy at the Northwestern State Portland Cement Company site is protective of human health and the environment.

Second Five-Year Review Report

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review Reports. In addition, Five-Year Review Reports identify issues found during the review, if any, and recommendations to address them.

The Agency is preparing this five-year review pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c) and the National Contingency Plan (NCP). CERCLA § 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The agency interpreted this requirement further in the NCP; 40 CFR § 300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (EPA) Region VII has conducted a five-year review of the remedial actions implemented at the Northwestern States Portland Cement Company (NWSPCC) site in Cerro Gordo County, Iowa. This review was conducted from November 2001 through September 2002. This report documents the results of the review.

This is the second five-year review for the NWSPCC site. The triggering action for this review is the date of the first five-year review, as shown in EPA's WasteLAN database: June 25, 1997. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain on the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1
Chronology of Site Events

Event	Date
Initial discovery of contamination	5/12/1986
Final listing on National Priorities List (NPL)	8/30/1990
Remedial Investigation/Feasibility Study (RIFS) complete	3/1990
Proposed Plan available for public comment	3/1990
Record of Decision (ROD) signed	6/26/1990
Remedial Design (RD) started	5/21/1991
Consent Decree for Remedial Design/Remedial Action (RD/RA) finalized	10/10/1991
Remedial Design completed	6/5/1992
Remedial Action (RA) construction began	6/24/1992
Preliminary Close Out Report signed	12/23/1993
Final Close Out Report	9/26/1994
Deletion from NPL	8/31/1995
Previous five-year review	6/25/1997

III. Background

Physical Characteristics

The NWSPCC site consists of the Holcim (US) Inc. (Holcim) cement manufacturing facility located just north of Mason City, Iowa, near the intersection of 25th Street and U.S. Highway 65. The facility has been known as the Northwestern States Portland Cement Company and Holnam, Inc. in the past. In general, the remedial actions at the Site involved an area known as the West Quarry located west of the Holcim plant. The Site location is as indicated on Attachments 1 and 2. Access to the NWSPCC site is through the Holcim facility office located west of U.S. Highway 65 on 17th Street N.W.

Land and Resource Use

The Site is located on the north side of the Mason City residential area. Another cement manufacturing plant is located just north of the NWSPCC site, with Calmus Creek between them. Calmus Creek flows to the Winnebago River, which is less than one mile east of the Site.

Groundwater flow in the area of the Site was primarily to the northeast, toward Calmus Creek and the Winnebago River. Potential pathways of groundwater migration were found to exist via the upper bedrock of the Devonian aquifer. Ten private wells drawing water from this aquifer were identified about a mile north of the Site as well as three wells in the Lime Creek Nature Preserve about a mile and a half northeast of the Site. Wells with higher capacity are completed in the Cambrian Jordan Sandstone at depths greater than 1200 feet and include the cement plant well and Mason City water supply wells. These deep wells are typically uncased through the Devonian aquifer, allowing Devonian water to enter the well.

History of Contamination

Cement has been manufactured at the NWSPCC site since 1908. The area referred to as the West Quarry was mined for limestone, a raw material for cement production, until 1950. The West Quarry had reached a depth of approximately 40 feet and covered an area of about 150 acres. In 1969, the company began using the West Quarry for the disposal of waste cement kiln dust (CKD). When disposal activities ceased in 1985 approximately two million tons of CKD had been placed in the quarry and the quarry's unfilled area had been reduced to approximately 40 acres. The open portion of the quarry filled with approximately 420 million gallons of water, known as the West Quarry pond.

In 1979, two seeps emerged from the northeastern portion of the filled West Quarry, and the water traveled over land and into Calmus Creek. The Iowa Department of Natural Resources (IDNR) found that downstream from the West Quarry the creek water potential of Hydrogen (pH) was elevated and the total dissolved solids were also above background levels. In October 1980, water samples obtained from the West Quarry pond had a pH value of about 12.5. A fish kill occurred in Calmus Creek in September 1986.

The major concerns at the NWSPCC site were contaminated surface water and groundwater resulting from contact with waste CKD in the West Quarry. The CKD is composed of a primary cement component, calcium oxide (CaO), which reacts with water and releases hydroxide ions (OH⁻) into solution. The hydroxide ion concentration directly controls the pH level of an aqueous solution. Local groundwater and surface water have been impacted by high pH levels, and by an increase in total dissolved solids content, as well as elevated levels of potassium, sulfate, and sodium. Trace amounts of heavy metals and phenol have also been detected sporadically. Of the contaminants identified, only arsenic is a possible carcinogen. The CKD in the West Quarry is a Resource Conservation and Recovery Act (RCRA) hazardous waste. Water at the West Quarry having a pH value greater than

12.5 exceeds the RCRA criterion for corrosivity and is therefore a RCRA hazardous waste.

Initial Response

In 1984, the University of Iowa Hygienic Laboratory conducted an investigation of Calmus Creek, which empties into the Winnebago River less than one mile east of the Site. During this investigation it was determined that surface water contamination of Calmus Creek was directly related to the NWSPCC site. According to the study, highly alkaline water, contaminated by contact with CKD stored in the West Quarry, had been discharged into Calmus Creek and had caused the creek to become contaminated.

In 1987 the EPA Region VII conducted a Site Inspection. Based upon the results of the Site Inspection, the NWSPCC site was proposed for the National Priorities List (NPL) in June 1988 and was added to the final NPL listing in August 1990.

In 1990 the Northwestern States Portland Cement Company completed an RI/FS under the enforcement oversight of the IDNR. In March 1990 the Proposed Plan identifying the preferred remedy was presented to the public, starting the period for public comment.

Basis for Taking Action

The U.S. Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR) produced a draft Health Assessment for the NWSPCC site, which concluded that the Site was a potential health concern because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. The ATSDR assessment expressed a concern for potential human exposure to chromium, lead, sodium, sulfate, and elevated pH via ingestion of groundwater from on site and off site private wells. Also, human exposure to elevated pH may occur and may have occurred in the past via dermal contact, ocular contact, and incidental ingestion of on site soil, sediment, surface water, and groundwater, and via inhalation of reintrained dust.

An Endangerment Assessment was conducted as a part of the remedial investigation. Arsenic was identified as presenting an unacceptable level of carcinogenic risk due to the consumption of groundwater from the Site.

The Endangerment Assessment did not address the major parameters affecting water quality at the Site. These parameters included the concentrations of sodium, potassium, sulfate, as well as the pH and total dissolved solids. All of these parameters have been found at elevated levels in groundwater and surface water at the NWSPCC site.

IV. Remedial Actions

Remedy Selection

The ROD for the NWSPCC site was signed on June 26, 1990. Remedial action objectives (RAOs) were developed as a result of data collected during the RI to aid in the development and screening of remedial alternatives that were considered for the ROD. The RAOs, related to in situ hydraulic isolation of the CKD deposit, for the Site were:

- Establishing inward hydraulic gradients around and beneath the CKD body, thus preventing off site migration;
- Minimizing saturation of the waste CKD;
- Recovering, treating, and discharging impacted groundwater; and
- Assessing the effectiveness of the remedial actions through long-term groundwater monitoring.

The selected remedy in the ROD includes the following actions:

- Dewatering of the West Quarry, which contained high pH water, acid-neutralization (treatment of the water), and discharge of the treated water into Calmus Creek;
- Construction of a permanent drain system in the dewatered West Quarry to collect precipitation runoff and groundwater inflow to the quarry;
- Placement of an engineered clay cap over the area of the West Quarry filled with CKD to minimize infiltration through the CKD;
- Installation of bedrock dewatering wells to collect contaminated groundwater beneath the West Quarry, preventing migration of contaminated groundwater from the Site, and maintaining groundwater levels below the CKD;
- Installation of CKD dewatering wells, if necessary, to facilitate CKD dewatering;
- Treatment of contaminated water to meet IDNR National Pollution Discharge Elimination System (NPDES) discharge permit limits for discharge to Calmus Creek; and
- Assurances that the dewatering system will be operated in perpetuity to maintain isolation of water from the waste CKD and to collect and treat any contaminated water

which is generated by the West Quarry.

Remedy Implementation

In a Consent Decree (CD) entered into with the United States on October 10, 1991, Northwestern States Portland Cement Company and Holnam Inc. agreed to perform the RD/RA and pay past costs and response costs associated with the cleanup of the Site. The RD was conducted in conformance with the ROD. The RD was approved by the EPA on June 24, 1992.

The major components of the RA, as stated in the ROD, commenced in 1989 with dewatering of the West Quarry. Construction of the cap over the quarry, the water treatment system, and groundwater extraction system began in June 1992 and were completed in October 1993. The low permeability clay cap was constructed to isolate the West Quarry from surface resaturation. Seven groundwater extraction wells were installed around the West Quarry to lower the water table below the CKD. Two additional groundwater monitoring wells were installed to enhance site monitoring. Attachment 3 shows the locations of monitoring wells. Attachment 4 shows the locations of the cap, extractions wells, and the treatment system.

According to the CD, the water removed from the West Quarry shall be treated until such time as samples of the water meets the performance standards for two consecutive quarters. The performance criteria for the water are as follows:

- pH 6.5-8.5
- Chromium 0.050 milligram per liter (mg/l)
- Lead 0.050 mg/l
- Cadmium 0.005 mg/l
- Nickel 0.200 mg/l

These performance standards are based on the EPA Maximum Contaminant Levels (MCLs) for drinking water. MCLs, which are set forth at 40 CFR Part 141, are the permissible level of a contaminant in water which is delivered to any user of a public water system.

Operation, monitoring, and maintenance of the system by Holcim has been on-going to achieve the RAOs identified for the Site. The extraction wells, which range from 160 to 220 feet deep, are able to produce sustainable production rates between 15 and 35 gallons per minute. The water pumped from the open portion of the West Quarry drainage system and from the groundwater extraction system is treated, as necessary, prior to discharge into Calmus Creek. The performance standards in the CD for the water discharged from the treatment system into Calmus Creek are as follows:

- pH 6.0-9.0
- Phenols 0.050 mg/l (maximum)
- Total Suspended Solids (TSS) 30 mg/l (average)
45 mg/l (maximum)

For discharge from the treatment system, the remedy shall achieve, at a minimum, the effluent standards established in the Iowa NPDES permit to meet the water quality standard of 750 mg/l of total dissolved solids.

The Site achieved construction completion status when the Preliminary Close Out Report was signed on December 23, 1993. The EPA and the state determined that all RA construction activities were performed according to the specifications. The Final Close Out Report for the Site was signed on September 26, 1994, and the Site was deleted from the NPL on August 31, 1995.

System Operations/Operation and Maintenance

Holcim continues to conduct long-term monitoring, inspection, and maintenance activities according to the Operations and Maintenance Manual, dated June 1994 and the Quality Assurance Project Plan, dated June 1992. The primary activities associated with the operation and maintenance (O&M) of the remedy include the following:

- Operating and maintaining the groundwater extraction system;
- Operating and maintaining the groundwater treatment facility;
- Inspecting, mowing and repairing erosion in the cap and drainage system; and
- Monitoring groundwater and maintaining the monitoring wells.

Table 2 gives the annual O&M costs for the Site for the past five years, as provided by Holcim. The estimate for O&M costs that was included in the ROD was approximately \$65,000 per year after the first year of operation. The CD directed that the cost estimate for O&M, which was developed during the FS, be refined and submitted in the final RD. The estimate for O&M in the RD was \$115,500, which is much closer to the actual costs than the amount that was included in the ROD. In the past five years these costs have been higher than \$115,500, on average. Implementation of the recommendations in this Five-Year Review Report should result in a reduction in the annual O&M costs.

Table 2
Annual Operation and Maintenance Costs

Year	Total Cost rounded to nearest \$1,000
1997	\$120,000
1998	65,000
1999	140,000
2000	185,000
2001	128,000

V. Progress Since the Last Review

The protectiveness statements in the first Five-Year Review Report were as follows:

“The groundwater extraction and treatment systems continue to be fully operational and functional. Operation of the systems treats the contaminated water collected and produces the groundwater table below the waste CKD, the inward hydraulic gradients, and the prevention of off site migration of site contaminants. The Remedial Objectives for the NWSPCC site remedy, as listed in Section 3.0, continue to be goals that are protective.”

The recommendations made in the first Five-Year Review Report were that remedial actions at the Site continue to be operated, maintained, and monitored indefinitely according to the approved O&M plan per the existing schedule.

VI. Five-Year Review Process

Administrative Components

Holcim was notified of the initiation of the five-year review on February 8, 2002. The five-year review was conducted by Diana Engeman of the EPA, Remedial Project Manager for the NWSPCC site, with assistance by other members of the Regional technical staff. Robert Drustrup of the Iowa Department of Natural Resources and Melissa Lauterbach-Barrett of the Iowa Department of Public Health assisted in the review as representatives of support agencies.

Community Involvement

In April 2002 a notice was placed in the Mason City Globe Gazette that a five-year review was

to be conducted and provided information on how to contact the EPA to provide input. A letter stating the same, as well as a history of the Site, was sent to elected officials, members of the media, and community members. The letter invited the recipients to submit any comments they might have to the EPA. No comments have been received.

Soon after approval of this Second Five-Year Review Report, a notice will be placed in the same newspaper announcing that the Report is complete, and that it is available to the public at the Mason City Public Library in Mason City, Iowa and the EPA Region VII office.

Document Review

This five-year review consisted of a review of relevant documents including Groundwater Sampling and Quality Assurance Reports and Annual Status Reports. See Attachment 5.

Data Review

Site Operation and Maintenance

The plan for site O&M is included in the Operations and Maintenance Manual. According to this manual, inspection and maintenance of the numerous parameters related to operation of the extraction system, treatment system, cap and drainage system, and groundwater monitoring were scheduled to be performed according to the frequency in Table 3, which is attached to this report as Attachment 6. The results of groundwater monitoring were reported twice annually in Groundwater Sampling and Quality Assurance Reports, and will be discussed more thoroughly in the next section of this report. Annual Status Reports were submitted which included the results of all other inspection and maintenance activities as well as a summary of the groundwater monitoring conducted during the year.

For this Five-Year Review Report, Annual Status Reports, submitted by GZA Environmental, Inc., on behalf of Holcim, were reviewed for 1997 through 2001. Contained in the Annual Status Reports were summaries of the semi-annual groundwater monitoring results; the condition of the cap and maintenance activities associated with the cap and drainage system for the past year; the treatment system O&M for the year; and a list and schedule of activities planned for the upcoming year.

Throughout the period of time since the first five-year review, the condition of the West Quarry cap and drainage system continued to be very good with routine maintenance and minor repairs. The vegetation is well established and is maintained by annual fertilizing, mowing, and bailing. Small areas of erosion have been identified and repaired but none have been deep enough to have gone through the topsoil and into the clay layer. Improvements were made in the drainage system, particularly around the treatment building. In 1998, two CKD silos were demolished and the waste disposed adjacent to the south face of the West Quarry. The area was capped with clay, covered with topsoil, and seeded. The plans for this work were approved by the EPA and were consistent with the requirements of the

RD for the West Quarry.

Repairs and modifications to the groundwater extraction and treatment systems were made as needed. This included the replacement of pumps and components that had become defective through use. The control equipment for the treatment system has been upgraded to provide improved operation and monitoring.

The NPDES permit for discharge of treated water into Calmus Creek was issued by the IDNR and compliance with the permit is monitored by the IDNR Field Office in Mason City. They do not report any issues with compliance for this permit.

Groundwater Monitoring

Groundwater monitoring has been conducted semi-annually since the first five-year review. Groundwater monitoring is conducted according to the Quality Assurance Project Plan for the RA and the Operations and Maintenance Manual. Attachment 3 is a map showing monitoring well locations at the Site. Monitoring well HOL-MW11B was reported to have been damaged since December 1996 and was unable to be sampled. During sampling in December 1999 monitoring well HOL-MW10 and HOL-MW2A were also identified as being unable to be sampled due to damage. However, HOL-MW10 was sampled again in December 2001. During each round of groundwater sampling, water level measurements were taken in each of the monitoring wells. This information was used to determine the direction of groundwater flow and whether the groundwater extraction system was maintaining an inward gradient. The flow configurations for each sampling event from 1997 through 2001 indicated that inward gradients toward the hydraulic isolation system were being maintained. A representative Groundwater Flow Map is presented in Attachment 3.

Attachment 7 is a table summarizing the groundwater analytical results, by monitoring well, for as far back as September 1992. Results for the field parameters of pH, groundwater temperature, and conductivity are listed as well as laboratory analytical concentrations for cadmium, chromium, lead, nickel, and phenols. In this table the results are compared against the performance standards that were established in the CD for pH, cadmium, chromium, lead, and nickel. Any value exceeding a performance standard is shaded.

Since the previous five-year review, the only wells continuing to exhibit elevated pH are HOL-MW1A, HOL-MW1B, HOL-MW2CR, and HOL-MW12. HOL-MW1A is in the CKD in the West Quarry and is frequently dry and cannot be sampled. It would be expected that if there is water in the well that can be sampled it would continue to exhibit high pH since it is in the contaminated material. The other three wells that continue to exhibit high pH are in the bedrock beneath the CKD. Once again, it is to be expected that these wells may exhibit high pH. However, as long as the groundwater extraction system continues to maintain an inward gradient, as it has, this groundwater will be treated and the migration of contaminated groundwater from the Site will be prevented. This aspect of the

remedy continues to be protective.

The only monitoring wells to exceed the performance standards for metals since the last five-year review were HOL-MW3B, HOL-MW6, and HOL-MW10. HOL-MW3B is a bedrock well just outside of the West Quarry and has exceeded the performance standard for lead twice since the last five-year review. As stated previously, the groundwater extraction system continues to maintain an inward gradient. Therefore, this groundwater will be treated and the migration of contaminated groundwater from the Site will be prevented. This aspect of the remedy continues to be protective. HOL-MW6 exceeded the performance standard for cadmium in June 1998 and HOL-MW10 exceeded the performance standard for cadmium in December 1998. These single occurrences of elevated levels of cadmium in these wells do not appear to be indicative of problems with the remedy. These wells will continue to be monitored for metals for the next five years.

According to the Statement of Work attached to the CD and the Quality Assurance Project Plan, groundwater monitoring was to be conducted at least quarterly during construction of the RA and for two years following the completion of construction, and then semi-annually for three years thereafter. After that time, groundwater monitoring was to be conducted annually. Construction of the RA was considered complete when the Preliminary Close Out Report was signed on December 23, 1993. Therefore, quarterly groundwater monitoring could have concluded after December 23, 1995, and semi-annual groundwater monitoring could have concluded after December 23, 1998. Annual groundwater monitoring could have begun as early as 1999. It will be recommended in this Five-Year Review Report that groundwater monitoring be conducted annually commencing in 2002. The remedy will continue to be fully protective with the implementation of this change.

Holcim has requested that analysis for cadmium, chromium, lead, nickel, and phenols be eliminated, or at the very least reduced in frequency, from the groundwater monitoring requirements. The Statement of Work attached to the CD provides for a reduction in the frequency of metals analysis if the levels found are below the performance standards set forth in the CD for four consecutive quarters. No such provision exists for reduction in the sampling frequency for phenols. Based upon the sampling results, which are presented in Attachment 7, analysis for cadmium, chromium, lead, and nickel will no longer be required for the following monitoring wells: HOL-MW1B, HOL-MW2CR, HOL-MW4, HOL-MW5A, HOL-MW5B, HOL-MW8, HOL-MW9, HOL-MW11A, HOL-MW12, and HOL-MW13. The results of monitoring for these compounds show that they meet or exceed the provisions in the CD for the reduction in frequency of metals analysis. Eliminating the analysis of the metals for these wells will have no adverse affect on the protectiveness of the remedy. Metals analysis will continue to be performed annually at all other monitoring wells. Phenols analysis will continue to be performed annually at all monitoring wells.

Holcim has requested that they be allowed to properly abandon monitoring wells HOL-MW2A, HOL-MW2C, and HOL-MW11B since they have been damaged and have not been able to

sample them for several years. According to the first Five-Year Review Report, HOL-MW2C was replaced by HOL-MW2CR in 1994. Therefore, HOL-MW2C may be abandoned. Prior to being damaged, HOL-MW2A typically was dry due to hydraulic isolation in the CKD. Abandonment of this well is appropriate and replacement is not necessary as there are other wells in the CKD. Prior to being damaged in 1997, HOL-MW11B had only one exceedence of the performance standards and it was for chromium in December 1993. There were no additional exceedences. The monitoring results of the other monitoring wells in the vicinity of HOL-MW11B do not indicate contamination problems that need to be tracked through the addition of a well to replace HOL-MW11B. Therefore, HOL-MW11B may be abandoned. The abandonment of these three wells will not adversely affect the protectiveness of the remedy.

Site Inspection

An inspection of the Site was conducted on April 25, 2002, by Victor Walkenhorst, an EPA grantee. (See Attachment 8). The purpose of the inspection was to assess the protectiveness of the remedy, including the integrity of the cap. Also included during the inspection was a review of the condition of the retention pond and a demonstration of the program controlling the extraction wells at the Site.

The West Quarry cap was found to be in good condition with no evidence of erosion paths from surface water drainage. The surface water drainage system appears to be operating properly.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of site documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions, and the results of the site inspection indicates that the remedy is continuing to function as intended by the ROD.

The O&M of the cap has been effective. Maintenance has been performed as scheduled and appears to be effective. While the O&M costs in the past five years exceed the estimate in the ROD and the revised estimate in the RD, they do not appear to be excessive and it is anticipated that they will decrease in the future.

The groundwater level measurements and the groundwater monitoring results indicate that the groundwater extraction system in the West Quarry continues to effectively lower the groundwater level in the CKD, collect contaminated groundwater from beneath the West Quarry, and prevent contaminated groundwater from migrating off site. The treatment system has been effectively treating the groundwater prior to discharge to Calmus Creek. This has been demonstrated by on-going compliance with the NPDES permit.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

There have been no changes in physical conditions or land use at the Site that would affect the protectiveness of the remedy. Also, due to site operational history, no new chemicals of concern are expected or have been detected.

Changes in Standards and To Be Considereds

For contaminants of concern at this Site (identified as indicator chemicals in the Endangerment Assessment) the ARARs established in the 1990 ROD and updated in the 1997 Five-Year Review Report remain protective of human health and the environment. Although there have been modifications to the MCLs for these chemicals since the initial ROD was issued, which were explained in detail in the 1997 Five-Year Review Report, these modifications do not call into question the protectiveness of the remedy. Additionally, the MCLs for the contaminants of concern at this Site remain unchanged since the completion of the first five-year review. Groundwater pH remains the primary parameter of concern at this Site. The MCL for groundwater (pH 6.5 – 8.5) has not changed since the first five-year review.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The only potentially complete exposure pathway is through ingestion of contaminated groundwater. Potential risks from ingestion of groundwater from this Site were calculated in the Endangerment Assessment. That exposure pathway was considered to be conservative in evaluating risk because it assumed that on site mean chemical concentrations were found in off site private wells as well as on site wells (i.e., this assumes that a person's water consumption comes completely from contaminated water). There has been no change in risk assessment methodology (e.g., daily intake rate calculations) that would alter risk estimates thereby changing the effectiveness of the remedy. Furthermore, the groundwater from this Site is not currently being consumed nor are there plans for this water to be consumed in the future. Hence, there is no exposure.

Toxicity values, and the nomenclature for the values, for the chemicals of concern summarized in Table II of the ROD, have changed since the issuance of that document. Table 3 provides both past and current toxicity values as well as hazard quotients and excess lifetime cancer risk estimates. Using current toxicity values, chromium and nickel levels remain protective of human health. Although the excess lifetime cancer risk posed by arsenic has dropped from 5×10^{-3} to 5.1×10^{-4} , this would still be an unacceptable level of risk if people were consuming the water. However, no one is consuming contaminated water and, more importantly, the implementation of the current remedy ensures that contaminated water will not migrate off site to contaminate municipal or private drinking water wells. Adverse health affects posed by exposure to lead in drinking water are no longer assessed using toxicity values. Instead, the MCL (with an action level of 0.015 mg/L for water at the tap) is used to

assess risk from lead in water. This action level has not changed from the previous five-year review and the remedy continues to be protective of human health and the environment.

Table 3
Comparison of Past and Current Toxicity Values

		ROD Toxicity Value				Current Toxicity Value			
Chemical Name	CDI (mg/kg/day)	RfDc (mg/kg/day)	PF	ROD HQ	ROD ELC	RfDo (mg/kg/day)	SF	Current HQ	Current ELC
Arsenic	3.40e-04	---	15	---	5.10e-03	3.00e-04	1.5	1.13	5.10e-04
Chromium	1.20e-03	5.00e-03	---	0.24	---	3.00e-03	---	0.40	---
Nickel	3.40e-04	1.00e-03	---	0.34	---	2.00e-02	---	0.02	---
Lead	4.50e-03	1.40e-03	---	3.21	---	---	---	---	---

ROD - Record of Decision

CDI - Chronic Daily Intake

RfDc - Chronic Reference Dose Concentration

PF - Cancer Potency Factor (mg/kg/day)⁻¹

ELC - Excess Lifetime Cancer Risk

HQ - Hazard Quotient

RfDo - Oral Reference Dose Concentration

SF - Slope Factor (mg/kg/day)⁻¹

HQ = CDI/RfD

ELC = CDI x PF or SF

Evaluation of Remedial Action Objectives (RAOs)

The response actions taken address the principal threats posed by this Site and continue to protect human health and the environment through; 1) manipulation of the hydraulic gradient so that contaminated water does not migrate off site to expose people to contaminated municipal or private well water; 2) capping of the Site which has prevented infiltration of water to the underlying contaminated media as well as eliminated human exposure to contaminated soil; 3) recovery and treatment of contaminated water so that no person is exposed to contaminants through the consumption of contaminated groundwater; and 4) long-term groundwater monitoring that allows for the analysis of contaminant concentration to assure that these levels remain protective of human health and the environment through comparisons with ARARs (i.e., MCLs). Therefore, the RAOs are effectively being met.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No new targets have been identified during the five-year review. No weather-related events have adversely affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD. There have been no changes to the physical conditions of the Site that would affect the protectiveness of the remedy. The ARARs cited in the ROD have been complied with. While there have been changes in some of the toxicity factors for the contaminants of concern that were used in the endangerment assessment, as shown in Table 3, due to the remediation activities, no exposure to contaminated media is occurring and therefore, toxicity has no bearing. There have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

VIII. Issues

Table 4
Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Schedule for future groundwater monitoring needs to be determined.	N	Y
Request by Holcim to abandon monitoring wells HOL-MW2A, HOL-MW2C, and HOL-MC11B.	N	N
Request by Holcim to discontinue analysis of groundwater samples for metals.	N	N
Request by Holcim to discontinue analysis of groundwater samples for phenols.	N	Y

IX. Recommendations and Follow-up Actions

For all of the recommendations and follow-up actions listed in Table 5, Holcim is the party responsible for implementing the actions and the EPA is the oversight agency. The IDNR will be kept informed of activities at the Site.

Table 5
Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Milestone Date	Affects Protectiveness (Y/N)	
			Current	Future
Schedule for future groundwater monitoring needs to be determined.	Groundwater monitoring will be conducted once annually pursuant to the Statement of Work attached to the Consent Decree.	12/31/2002	N	Y
Request by Holcim to abandon monitoring wells HOL-MW2A, HOL-MW2C, and HOL-MW11B.	Monitoring wells HOL-MW2A, HOL-MW2C, and HOL-MW11B may be properly abandoned.	12/31/2002	N	N
Request by Holcim to discontinue analysis of groundwater samples for metals.	Metals analysis may be discontinued at HOL-MW1B, HOL-MW2CR, HOL-MW4, HOL-MW5A, HOL-MW5B, HOL-MW8, HOL-MW9, HOL-MW11A, and HOL-MW12.	12/31/2002	N	N
Request by Holcim to discontinue analysis of groundwater samples for phenols.	There will be no change in the requirement to analyze for phenols at all monitoring wells.	Not applicable	N	Y

X. Protectiveness Statement

The remedy at the Northwestern States Portland Cement Company site is protective of human

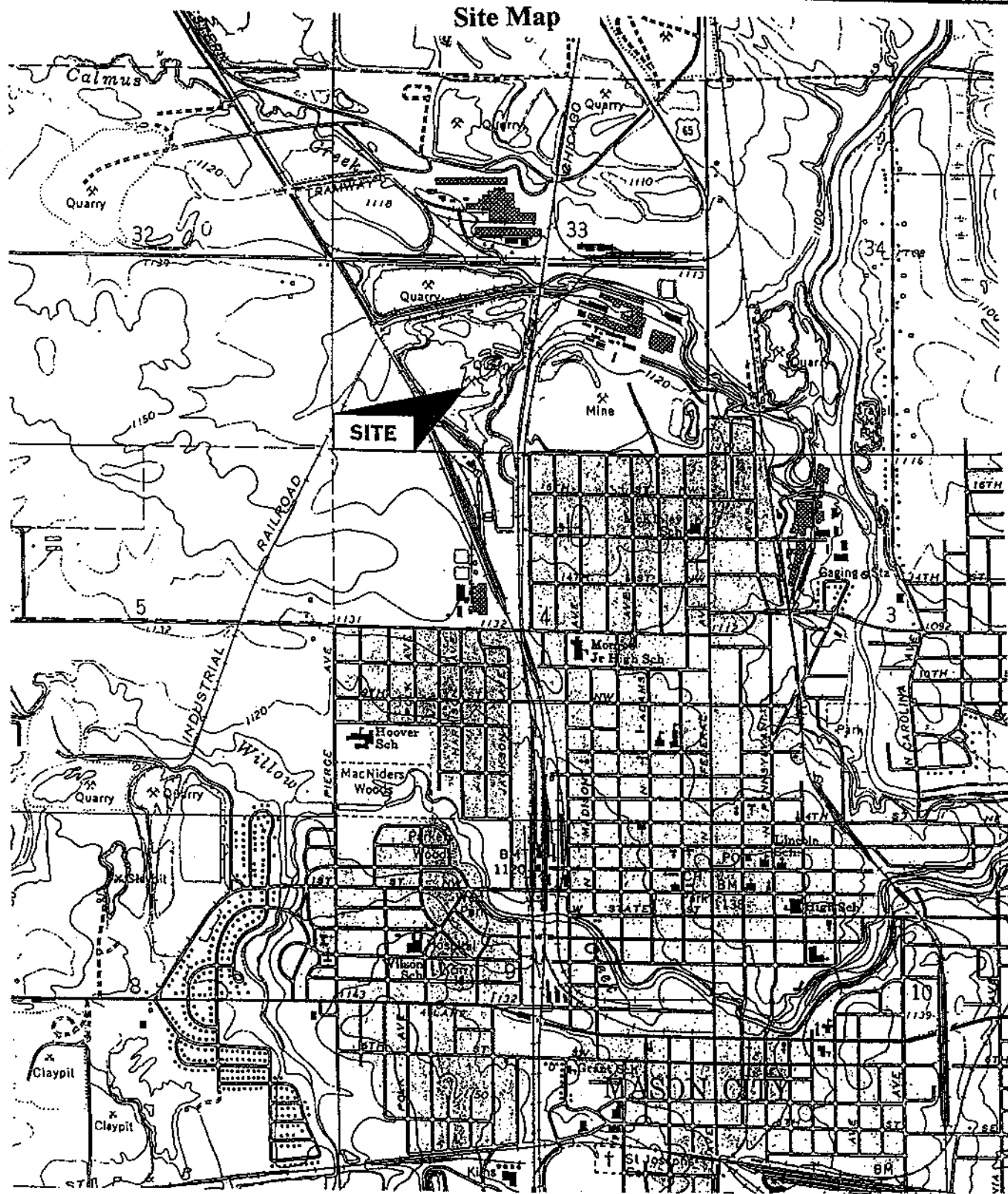
health and the environment.

XI. Next Review

The next five-year review for the Northwestern States Portland Cement Company Superfund site is required by September 16, 2007, five years from the date of this review.

Attachment 1

Site Map



SITE LOCATION MAP

HOLCIM (US), INC.
MASON CITY, IOWA

SCALE IN FEET

0 1000 2000

CONTOUR INTERVAL = 10 FEET

SOURCE:

USGS TOPOGRAPHIC MAP
MASON CITY, IOWA

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DRAWN BY: CJM

REVIEWED BY:

DATE: 1/01

FILENAME: 150073/TB1

GZA

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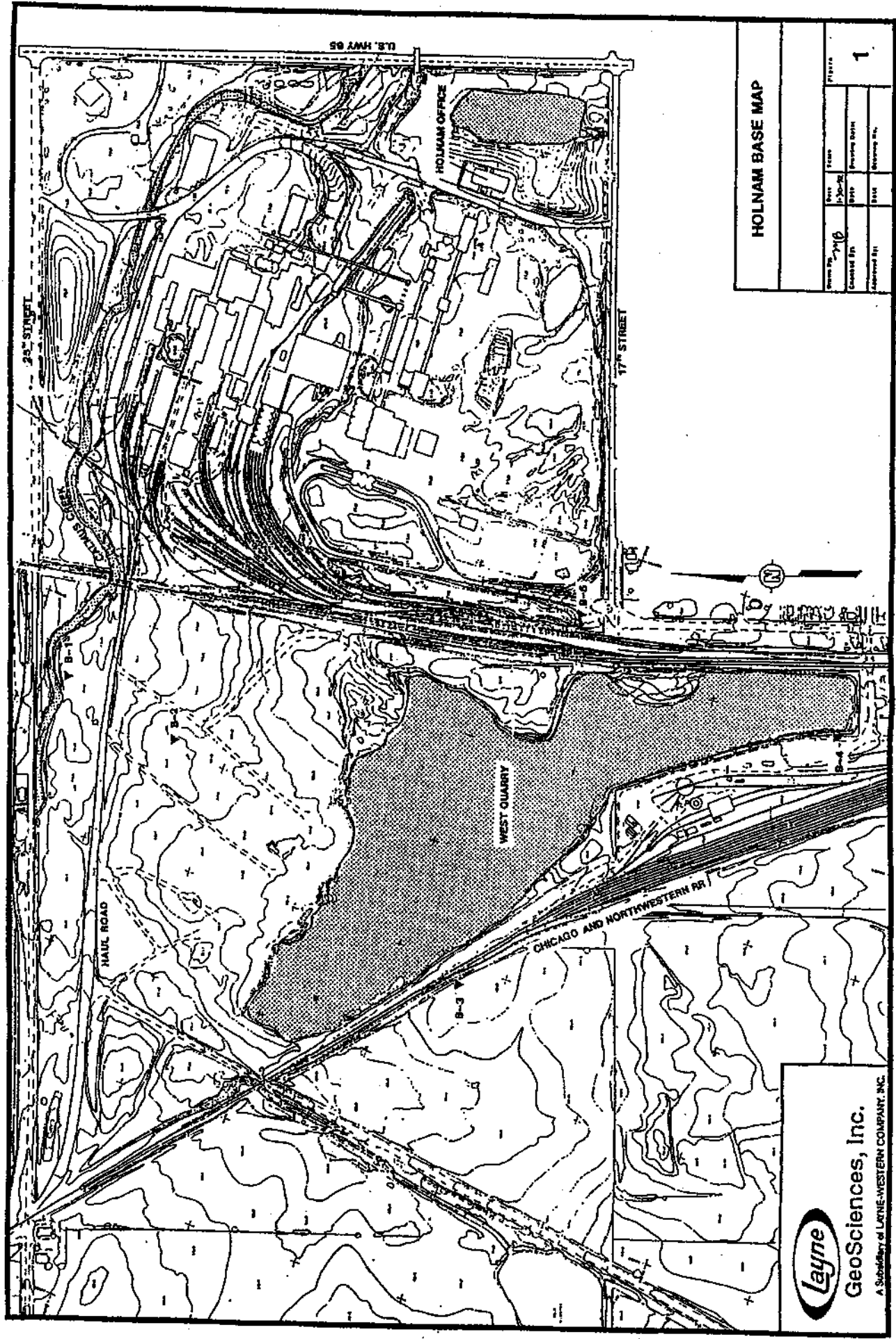
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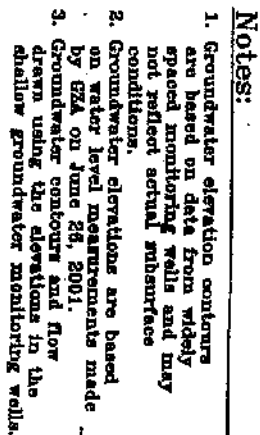
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Attachment 2
West Quarry Site Map



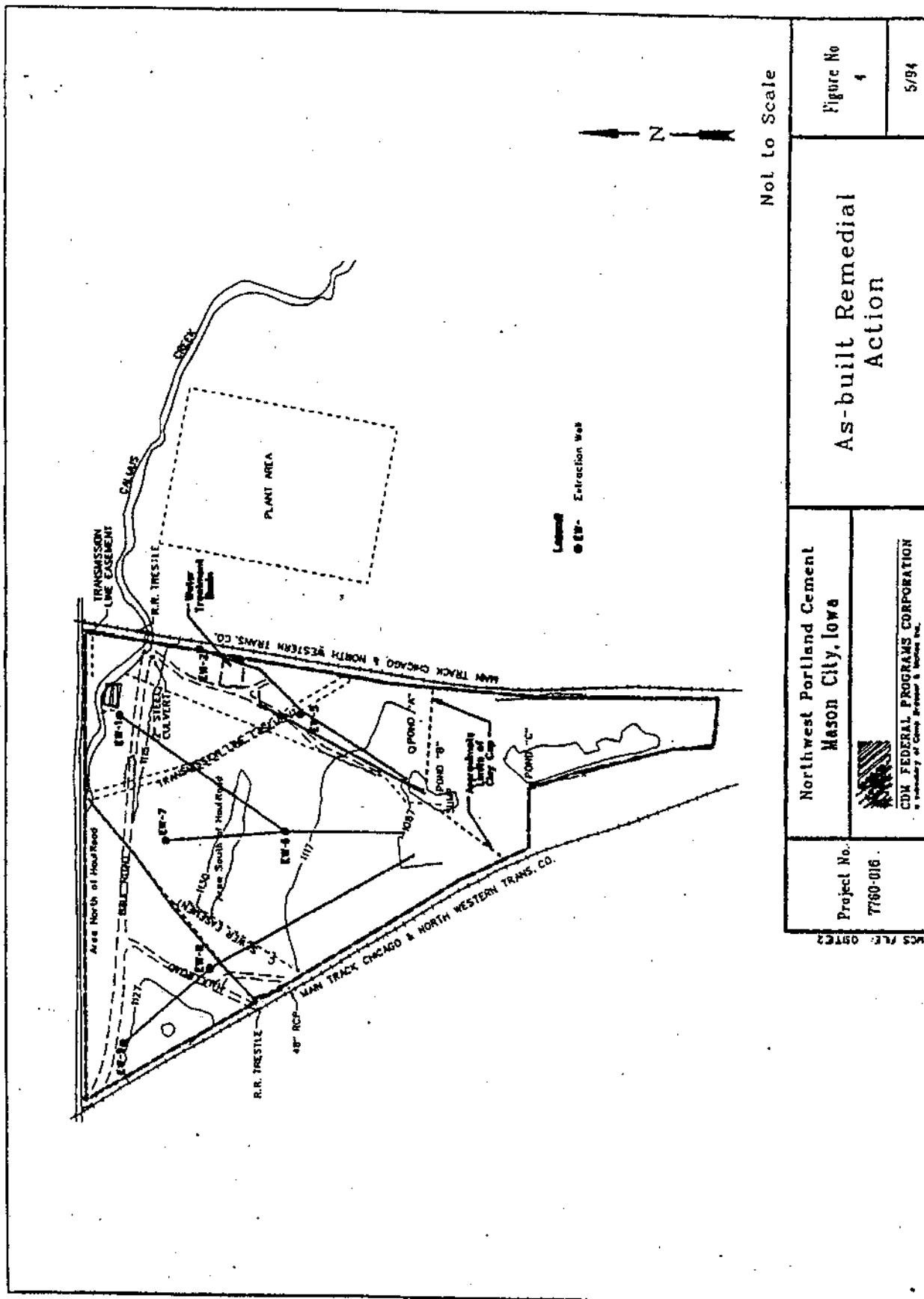
HOLNAM BASE MAP				
Project No.	10	Scale	1" = 100'	Figure
Contract No.		Date	10-10-82	1
Approved By		Revised Date		
		Revised No.		

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Attachment 4 Remedial Action Map



Not to Scale

Project No. 7780-016	Northwest Portland Cement Mason City, Iowa	Figure No 4
CDM FEDERAL PROGRAMS CORPORATION a subsidiary of CDM, Inc.	As-built Remedial Action	5/94

WCS FILE: 097C2

Attachment 5

List of Documents Reviewed

Consent Decree, United States of America v. Northwestern States Portland Cement Company and Holnam Inc., October 10, 1991.

December 1999 Groundwater Sampling and Quality Assurance Report Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, June 6, 2000.

Five-Year Review, Northwestern States Portland Cement Company (NWSPCC) Site, Mason City, Iowa, June 25, 1997.

Groundwater Sampling and Quality Assurance Report Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, October 22, 1999.

Groundwater Sampling and Quality Assurance Report (December 2000) Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, April 27, 2001.

Groundwater Sampling and Quality Assurance Report (December 2001) Holcim (US) Inc. West Quarry Remediation Site, Mason City, Iowa, March 4, 2002.

Groundwater Sampling and Quality Assurance Report (June 2000) Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, October 11, 2000.

Groundwater Sampling and Quality Assurance Report (June 2001) Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, September 20, 2001.

Operations and Maintenance Manual for the West Quarry Site Remediation System, Holnam, Inc., Mason City, Iowa, June 1994.

Quality Assurance Project Plan for the Remedial Action at the West Quarry Site, Mason City, Iowa, June 1992.

Quality Assurance Review, August 1997 Semi-Annual Sampling Event and Annual Cap Inspection Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, December 8, 1997.

Quality Assurance Review, June 1998 Semi-Annual Groundwater Sampling Event West Quarry Remediation Site, Mason City, Iowa, November 3, 1998.

Quality Assurance Review - Revised Holnam Inc. West Quarry Remediation Site, Mason City, Iowa, May 20, 1999.

Record of Decision for Northwestern States Portland Cement Company Site, Mason City, Iowa, June 20, 1990.

Remedial Action Annual Status Report for 1997 West Quarry Site Holnam, Mason City, Iowa, November 21, 1997.

Remedial Action Annual Status Report for 1998 Holnam Inc. West Quarry Site, Mason City, Iowa, December 1, 1998.

Remedial Action Annual Status Report for 1999 Holnam Inc. West Quarry, Mason City, Iowa, March 31, 2000.

Remedial Action Annual Status Report for 2001 Holcim (US) Inc. West Quarry Site, Mason City, Iowa, April 18, 2002.

Remedial Design Plan for the West Quarry Site, Mason City, Iowa, June 1992.

TABLE 3 Inspection and Maintenance Frequency				
Daily	Weekly	Quarterly	Semi-Annual	Annual
Discharge flow	Sample collection if creek flow is > 10 cfs	Sample monitoring wells	Inspect and service acid meter pump	Check sediment accumulation in sump and sedimentation basin
Discharge pH	Check condition of retention pond pumps and lines	Inspect cap		
Discharge TDS	Check condition of acid tanks and lines	Inspect erosion control structures		
Creek flow				
Creek TDS				
Extraction well flow				
Extraction well levels				
Sump pH				
Sump flow				
Acid flow				
Acid level				
Sample collection if creek flow is < 10 cfs				

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Attachment 7

GROUNDWATER ANALYTICAL RESULTS

Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED	FIELD PARAMETERS			LABORATORY PARAMETERS				
	pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS	6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW1A Sep-92	12.7	13	13,000	<0.001	<0.001	0.002	<0.02	0.073
Dec-92	12.7	11	15,180	<0.001	<0.001	<0.001	0.03	0.07
Mar-93	12.7	8	17,640	<0.001	<0.001	<0.001	0.02	0.065
Jun-93	12.7	14	17,152	<0.001	<0.001	0.005	0.04	0.01
Sep-93	Insufficient Sample for Field Parameters			0.002	0.011	0.027	0.042	0.16
Dec-93	Insufficient Water For Sample From Dec-93 to Dec-97							
Jun-98	>13	11.6	7,980	0.004	0.002	0.009	0.024	0.088
Dec-98	Dry							
Jun-99	12.1	12.8	7,510	<0.003	<0.001	0.004	0.019	0.11
Dec-99	Dry							
Jun-00	Insufficient Sample for Field Parameters			<0.0002	0.0014	0.002	0.022	0.164
Dec-00	Dry							
Jun-01	12.8	14.5	6,670	<0.0002	<0.001	0.007	0.02	0.046
Dec-01	Insufficient Water for Field Parameters or Analytical Samples							
HOL-MW1B Sep-92	12.5	14	14,080	<0.001	0.006	0.002	<0.02	0.073
Dec-92	12.5	11.3	14,796	<0.001	0.042	0.04	0.04	0.04
Mar-93	12.7	9	18,590	0.003	0.031	0.01	0.02	0.029
Jun-93	12.9	14	40,320	<0.005	0.004	0.019	0.07	0.09
Sep-93	11.5	13.02	39,600	0.008	0.022	0.018	<0.02	<0.05
Dec-93	12.5	10.5	23,630	0.001	0.013	0.039	0.03	<0.05
Mar-94	12.7	10	11,200	<0.001	0.007	0.02	<0.02	<0.05
Jun-94	12.5	13.9	20,340	<0.005	<0.01	<0.003	<0.03	0.056
Sep-94	13.0	15	31,250	0.011	0.028	0.2	0.05	0.121
Dec-94	13.4	5	5,846	<0.002	0.007	0.036	0.016	0.163
Apr-95	12.8	7	6,191	<0.002	<0.002	<0.002	<0.02	0.042
Jun-95	13.2	14	15,360	<0.002	<0.002	0.003	0.023	0.047
Sep-95	13.4	11	4,400	0.001	<0.001	<0.002	0.006	0.079
Dec-95	>13	7	27,180	0.008	0.002	<0.002	0.009	0.044
Jun-96	12.5	15	8,375	0.004	<0.001	<0.005	0.006	0.023
Dec-96	>13	7.1	46,100	0.007	<0.003	0.011	0.017	0.081
Aug-97	>13	11.3	76,900	<0.01	<0.015	0.009	<0.055	0.159
Dec-97	>13	9.4	77,300	<0.001	0.001	<0.005	0.015	0.018
Jun-98	>13	12.9	62,200	<0.001	<0.001	<0.001	0.021	0.088
Dec-98	>13	11.5	60,100	0.002	0.005	0.014	0.014	2
Jun-99	12.7	13.8	48,000	0.003	<0.001	0.002	0.015	0.393
Dec-99	12.4	7.1	46,600	0.003	0.003	<0.001	0.012	<0.25
Jun-00	13.0	13.3	48,500	0.003	<0.001	<0.001	0.032	<0.25
Dec-00	>13.0	9.8	34,600	0.0006	<0.001	<0.001	0.005	<0.05
Jun-01	13.6	15.1	32,300	0.003	<0.001	<0.001	0.01	0.148
Dec-01	12.9	9.5	10,500	0.004	0.004	<0.001	0.063	0.019

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED	FIELD PARAMETERS			LABORATORY PARAMETERS					
	pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)	
PERFORMANCE STANDARDS	6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS	
HOL-MW2B	Sep-92	11.7	16	9,075	<0.001	0.008	0.005	0.026	0.063
	Dec-92	12.3	11.3	9,727	<0.001	0.009	0.008	0.03	0.01
	Mar-93	12.4	11	11,040	0.002	0.122	0.003	<0.02	<0.01
	Jun-93	12.2	15	9,375	<0.001	0.012	0.011	0.07	0.07
	Sep-93	11.7	11	6,348	0.002	0.032	0.028	<0.02	0.13
	Dec-93				Insufficient Water For Sample				
	Mar-94				Insufficient Water For Sample				
	Jun-94				<0.005	0.1	0.5	0.03	0.076
	Sep-94				Insufficient Water For Sample Since Sep-94				
	Jun-99	8.2	13	2,890	0.001	0.008	0.013	0.036	<0.025
	Dec-99				Insufficient Water For Sample				
	Jun-00				Dry				
	Dec-00				Dry				
	Jun-01	7.8	13.6	1,700	0.0003	0.0015	0.011	0.004	0.009
	Dec-01				Dry				
HOL-MW2CR	Mar-94	10.3	7	7,550	0.006	0.031	0.014	<0.02	0.07
	Jun-94	10.4	19	5,424	<0.005	<0.01	0.005	<0.03	0.016
	Sep-94	9.2	14	5,376	0.002	0.065	0.077	0.126	0.013
	Dec-94	10.6	7	6,342	<0.002	0.005	0.013	0.033	0.021
	Apr-95	10.4	11	7,604	<0.002	0.004	0.005	0.028	0.012
	Jun-95	10.4	15	7,500	<0.002	0.004	0.007	0.021	0.009
	Sep-95	10.3	11	8,300	0.003	0.003	0.003	0.015	0.035
	Dec-95	10.4	9	8,580	0.002	0.002	0.004	0.014	0.019
	Jun-96	10.4	15	6,875	<0.002	0.002	<0.005	0.016	0.015
	Dec-96	10.3	9	8,180	<0.002	<0.003	0.01	0.011	0.023
	Aug-97	10.1	12.6	8,281	<0.01	<0.015	0.01	<0.055	0.03
	Dec-97	10.5	10	8,030	<0.001	0.004	<0.005	0.016	0.01
	Jun-98	10.2	14.8	7,540	0.002	0.003	0.012	0.014	0.019
	Dec-98	10.1	14.4	7,550	0.003	0.021	<0.001	0.009	<0.025
	Jun-99	9.8	12.4	7,150	<0.001	0.004	0.002	0.011	<0.025
	Dec-99	10.4	5.7	7,020	<0.0003	0.006	0.001	0.011	<0.025
	Jun-00	9.7	12	2,210	0.005	<0.001	<0.001	0.008	<0.025
	Dec-00	10.7	7.3	5,630	0.00026	<0.001	<0.001	0.008	<0.025
	Jun-01	9.8	13.2	6,210	0.0002	<0.001	<0.001	0.009	0.005
	Dec-01	10.2	12	4,500	0.0003	<0.001	<0.001	0.009	0.049
HOL-MW3A	Sep-92	7.3	24	622	<0.001	0.018	0.008	<0.02	0.01
	Dec-92	7.2	9.2	722	<0.001	0.04	0.019	<0.02	<0.01
	Mar-93	7.3	11.5	680	<0.001	0.051	0.016	0.02	<0.01
	Jun-93	7.5	10	532	<0.001	0.048	0.028	0.02	<0.01
	Sep-93	6.8	11	690	0.001	0.01	0.02	<0.02	<0.05
	Dec-93	7.4	12.2	630	0.002	0.246	0.047	<0.02	<0.05

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW3A (Continued)	Mar-94	7.6	8	588	1.26	0.099	0.026	<0.02	<0.05
	Jun-94	7.0	11	693	<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	7.2	8	647	<0.002	0.031	0.015	0.037	0.008
	Dec-94	7.2	9	644	<0.002	0.005	0.005	<0.008	0.005
	Apr-95	7.7	12	603	<0.002	0.003	0.002	<0.008	0.008
	Jun-95	7.1	14	640	<0.002	0.021	0.015	0.023	0.006
	Sep-95	7.5	10.5	700	<0.001	0.003	<0.002	0.004	0.055
	Dec-95	7.6	8.5	725	0.007	0.076	0.031	0.064	0.012
	Jun-96	7.2	7	605	0.003	0.042	0.02	0.035	0.014
	Dec-96	7.7	7.2	750	<0.002	0.02	0.012	0.022	0.02
	Aug-97	7.0	9.3	1,110	<0.01	<0.015	0.006	<0.055	0.007
	Dec-97	6.8	8.3	810	<0.001	0.006	0.026	0.065	0.014
	Jun-98	7.4	8.5	900	0.002	0.006	0.009	0.014	0.061
	Dec-98	7.4	8.6	900	0.003	0.013	0.002	0.003	<0.025
	Jun-99	7.8	10	840	<0.001	0.005	0.008	0.017	<0.025
	Dec-99	8.2	8.2	780	0.002	0.033	0.018	0.035	<0.025
	Jun-00	7.3	10	760	0.0004	0.0035	0.007	0.008	<0.025
	Dec-00	6.8	8.5	620	0.00064	0.0045	0.00113	0.005	<0.025
	Jun-01	7.4	11.6	620	<0.0002	0.002	0.002	<0.003	0.006
	Dec-01	6.3	11	500	0.0005	0.018	0.02	0.028	<0.005
HOL-MW3B	Sep-92	7.2	20	417	<0.001	0.015	0.006	<0.02	0.01
	Dec-92	7.2	6.5	722	<0.001	0.023	0.053	<0.02	<0.01
	Mar-93	7.3	9	1,001	0.003	0.016	0.03	<0.02	<0.01
	Jun-93	6.9	11	1,035	<0.001	0.007	0.02	0.02	<0.01
	Sep-93	6.9	10.5	1,029	<0.001	0.018	0.006	<0.02	<0.01
	Dec-93	7.2	6	1,085	<0.001	0.011	0.023	<0.02	<0.05
	Mar-94	7.5	10	980	0.003	0.022	0.031	<0.02	<0.05
	Jun-94	7.4	12	1,059	<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	7.5	10	910	<0.002	<0.002	0.017	<0.008	0.045
	Dec-94	7.1	8	1,029	<0.002	<0.002	0.009	<0.008	0.012
	Apr-95	7.3	11	1,005	<0.002	<0.002	0.031	<0.008	<0.005
	Jun-95	7.1	12	1,005	<0.002	0.003	0.023	<0.008	<0.005
	Sep-95	7.2	10	1,000	<0.001	0.001	0.008	0.002	0.042
	Dec-95	7.5	4	870	0.005	0.003	0.023	0.005	0.008
	Jun-96	7.0	13	860	<0.001	0.001	0.018	0.003	0.015
	Dec-96	7.1	7.8	1,210	<0.002	<0.003	0.005	<0.011	0.035
	Aug-97	6.7	8.17	1,410	<0.01	<0.015	0.015	<0.055	0.015
	Dec-97	6.8	8	1,370	<0.001	0.001	0.024	0.004	0.038
	Jun-98	7.4	9.4	1,360	0.002	0.003	0.059	0.007	0.028
	Dec-98	7.2	9.5	1,470	0.002	0.004	0.056	0.003	<0.025
	Jun-99	7.8	10.5	1,170	<0.001	<0.001	0.012	0.007	<0.025

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW3B (Continued)	Dec-99	8.0	7.7	1,900	<0.00026	0.017	0.00109	0.004	<0.025
	Jun-00	7.1	10.5	1,290	<0.0002	<0.001	0.023	<0.003	<0.025
	Dec-00	6.7	8.1	1,020	0.00021	<0.001	0.0354	0.005	Bottle Broken
	Jun-01	7.5	13	1,080	0.001	<0.001	0.047	0.005	0.006
	Dec-01	6.5	10	800	<0.0002	<0.001	0.0143	0.004	<0.005
HOL-MW4	Sep-92	6.8	26.5	1,800	<0.001	0.012	0.005	<0.02	<0.01
	Dec-92	6.7	9.8	2,284	<0.001	0.023	0.011	0.08	<0.01
	Mar-93	7.1	9	1,430	<0.001	0.007	0.004	<0.02	<0.01
	Jun-93	7.0	13	1,980	0.001	0.017	0.016	0.03	<0.01
	Sep-93	7.0	12	4,221	<0.001	0.018	0.006	<0.02	<0.01
	Dec-93	7.2	9	1,430	<0.001	0.007	0.003	<0.02	<0.05
	Mar-94	7.1	10	1,400	0.001	0.011	0.005	<0.02	<0.05
	Jun-94	Insufficient Sample for Field Parameters			<0.005	<0.01	<0.003	<0.003	<0.01
	Sep-94	6.9	10	1,960	<0.002	<0.002	<0.002	<0.008	<0.005
	Dec-94	6.8	9	1,573	<0.002	<0.002	<0.002	<0.008	0.008
	Apr-95	7.3	11	1,474	<0.002	0.004	<0.002	<0.008	<0.005
	Jun-95	7.3	11	1,104	<0.002	0.005	0.005	<0.008	0.013
	Sep-95	7.4	10	1,550	<0.001	0.003	0.002	0.003	0.031
	Dec-95	7.1	7	1,740	0.008	0.004	0.002	0.002	0.021
	Jun-96	7.1	13.2	1,165	<0.001	0.002	<0.001	0.002	0.029
	Dec-96	7.4	9.5	2,450	<0.002	<0.003	0.003	<0.011	0.016
	Aug-97	6.9	9.1	3,170	<0.01	<0.015	<0.005	<0.055	0.041
	Dec-97	6.7	8.6	3,530	0.002	0.004	0.004	0.004	0.007
	Jun-98	7.1	11.6	3,160	<0.001	0.003	0.002	0.003	0.057
	Dec-98	7.2	12.4	2,700	<0.001	0.003	<0.001	<0.002	<0.025
	Jun-99	7.5	11.4	2,620	<0.001	0.002	0.002	0.005	<0.025
	Dec-99	7.8	6.7	2,400	0.0004	0.004	<0.001	0.003	<0.025
	Jun-00	5.8	10.4	3,150	<0.0002	0.0015	<0.001	<0.003	<0.025
	Dec-00	5.7	10.4	3,950	<0.0002	<0.001	0.0013	<0.003	<0.025
	Jun-01	6.6	11.1	2,900	<0.0002	0.001	0.002	<0.003	0.005
	Dec-01	6.7	9	2,600	<0.0002	0.002	0.0024	<0.003	0.099
HOL-MW5A	Sep-92	10.5	9	486	Not Enough Sample for Laboratory Analyses				
	Dec-92	10.7	9.5	568	<0.001	0.003	0.004	<0.02	<0.01
	Mar-93	10.4	8	500	0.001	0.002	0.005	<0.02	0.01
	Jun-93	10.5	12	670	<0.001	0.004	0.002	0.02	0.04
	Sep-93	9.8	10	639	Not Enough Sample for Laboratory Analyses				
	Dec-93	10.1	10	686	<0.001	<0.001	0.003	<0.02	<0.05
	Mar-94	10.1	10	630	0.002	0.002	<0.001	0.034	<0.05
	Jun-94	9.5	12.1	603	<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	9.8	11	552	<0.002	<0.002	<0.002	<0.008	0.165
	Dec-94	9.1	6	543	<0.002	<0.002	0.002	<0.008	0.011

TABLE I
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW5A (Continued)	Apr-95	8.9	5.5	550	<0.002	<0.002	<0.002	<0.008	0.01
	Jun-95	9.0	13	594	<0.002	0.002	0.006	<0.008	0.012
	Sep-95	9.2	12.5	600	<0.001	0.004	0.007	0.01	0.016
	Dec-95	8.3	6	700	0.002	0.002	0.003	0.004	0.008
	Jun-96	8.0	10	595	<0.001	0.001	<0.001	0.003	0.009
	Dec-96	8.2	9	880	<0.002	<0.003	0.005	<0.011	<0.005
	Aug-97	7.7	9.3	930	<0.01	<0.015	0.006	<0.055	0.027
	Dec-97	8.0	9.8	840	<0.005	<0.005	0.001	<0.01	<0.005
	Jun-98	8.1	10.2	950	0.001	0.002	0.007	0.01	0.049
	Dec-98	7.8	10	870	<0.001	0.001	0.001	0.003	<0.025
	Jun-99	8.6	11	900	<0.001	<0.001	0.003	0.01	<0.25
	Dec-99	8.9	6.1	920	<0.0003	0.002	<0.001	0.003	<0.025
	Jun-00	7.9	12.6	1,030	<0.0002	<0.001	<0.001	<0.003	<0.025
	Dec-00	8.4	11.2	880	0.00049	<0.001	0.00477	0.008	<0.025
	Jun-01	7.4	15.9	830	<0.0002	<0.001	0.003	0.003	<0.005
	Dec-01	7.3	10	470	<0.0002	0.0011	0.0017	<0.003	0.009
HOL-MW5B	Sep-92	11.3	9	602	<0.001	0.005	0.008	<0.02	0.013
	Dec-92	10.5	9.4	551	<0.001	0.001	0.002	<0.01	<0.01
	Mar-93	8.3	1	644	0.002	0.001	<0.001	<0.02	<0.01
	Jun-93	9.6	12	670	<0.001	0.004	0.002	0.04	0.03
	Sep-93	8.5	10.1	714	0.002	0.008	0.003	<0.02	<0.05
	Dec-93	9.7	11	662	0.001	<0.001	<0.001	<0.02	<0.05
	Mar-94	7.6	9	715	<0.001	0.002	<0.001	<0.02	<0.05
	Jun-94	7.7	14	717	<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	8.5	12	536	<0.002	<0.002	<0.002	<0.008	0.006
	Dec-94	8.1	8	588	<0.002	<0.002	<0.002	<0.008	0.006
	Apr-95	8.3	5	711	0.002	<0.002	<0.002	<0.008	0.007
	Jun-95	8.2	12.5	765	<0.002	0.002	0.005	<0.008	0.007
	Sep-95	7.6	13	660	<0.001	0.012	0.014	0.013	0.02
	Dec-95	6.4	3.5	790	0.004	0.013	0.01	0.013	0.008
	Jun-96	7.6	16.5	605	<0.001	<0.001	<0.001	0.001	0.014
	Dec-96	8.5	9	770	<0.002	0.007	0.01	0.015	0.017
	Aug-97	7.0	11.8	1,060	<0.01	<0.015	0.013	<0.055	0.03
	Dec-97	8.6	9.1	950	<0.005	<0.005	<0.001	<0.01	0.008
	Jun-98	8.2	9.8	970	0.003	0.002	0.007	0.01	0.014
	Dec-98	7.6	9.2	1,270	<0.001	<0.001	<0.001	0.003	<0.025
	Jun-99	8.6	11	870	<0.001	<0.001	<0.001	0.005	<0.025
	Dec-99	8.9	5	800	<0.003	<0.001	<0.001	<0.003	<0.025

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW5B (Continued)	Jun-00	8.1	12.6	890	<0.0002	<0.001	<0.001	<0.003	<0.025
	Dec-00	8.2	10	680	<0.0002	<0.001	<0.001	<0.003	<0.025
	Jun-01	7.2	14.3	780	<0.0002	<0.001	0.002	0.004	<0.005
	Dec-01	7.4	9	700	<0.0002	<0.001	<0.001	<0.003	0.012
HOL-MW6	Sep-92	6.9	14	1,050	<0.001	0.09	0.028	<0.02	0.013
	Dec-92	7.0	7	1,057	<0.001	0.04	0.022	0.04	0.04
	Mar-93	7.1	3.5	880	<0.001	0.028	0.008	<0.02	0.01
	Jun-93	7.1	13	924	<0.001	0.042	0.023	0.01	0.01
	Sep-93	6.9	17.2	814	0.001	0.027	0.019	<0.02	<0.05
	Dec-93	7.4	7	830	0.001	0.028	0.016	<0.02	<0.05
	Mar-94	7.0	5.5	1,177	0.002	0.092	0.039	<0.02	<0.05
	Jun-94	7.2	16	1,452	<0.005	0.017	0.014	<0.03	<0.01
	Sep-94	7.4	15.5	800	<0.002	0.01	0.026	<0.008	0.007
	Dec-94	6.9	7.5	1,714	<0.002	<0.002	0.007	<0.008	0.016
	Apr-95	7.6	7	1,812	<0.002	0.034	0.035	0.028	0.028
	Jun-95	7.1	19	650	<0.002	0.013	0.023	0.011	0.011
	Sep-95	6.9	16	1,210	<0.001	0.019	0.016	0.011	0.012
	Dec-95	7.1	6	1,860	0.002	0.008	0.007	0.008	0.012
	Jun-96	7.0	18	920	0.002	0.027	0.023	0.011	0.008
	Dec-96	7.1	6.8	1,660	<0.002	0.012	0.014	<0.011	0.02
	Aug-97	6.7	17	1,320	<0.01	<0.015	<0.005	<0.055	0.019
	Dec-97	8.6		1,850	<0.005	0.025	0.014	0.013	0.009
	Jun-98	7.1	14.7	1,690	0.006	0.04	0.045	0.02	0.013
	Dec-98	7.2	13.8	1,850	<0.001	0.016	0.023	0.011	<0.025
	Jun-99	7.3	14.3	1,170	<0.001	0.014	0.023	0.015	<0.025
	Dec-99	7.4	6.5	1,080	<0.0003	0.001	<0.001	0.009	<0.025
	Jun-00	7.1	13.9	1,260	0.0012	0.0052	0.0107	0.007	<0.025
	Dec-00	7.0	9.4	1,000	<0.0002	0.0012	0.00416	0.004	<0.025
	Jun-01	6.9	15.5	1,000	<0.0002	0.003	0.006	0.007	0.007
	Dec-01	7.6	10	900	0.0002	0.0087	0.0047	0.007	0.009
HOL-MW8	Sep-92	7.1	10.5	1,529	<0.001	0.013	0.011	<0.02	0.013
	Dec-92	6.7	7	1,888	<0.001	0.033	0.008	0.02	0.04
	DUP				<0.001	0.032	0.013	<0.02	0.02
	Mar-93	6.7	8.5	1,595	<0.001	0.014	0.008	<0.02	<0.01
	DUP				0.001	<0.001	0.005	<0.02	<0.01
	Jun-93	6.9	11	2,208	<0.001	0.031	0.007	<0.02	0.02
	DUP				<0.001	0.022	0.005	<0.02	<0.01
	Sep-93	6.7	11.5	1,156	<0.001	0.031	0.003	<0.02	<0.05
	DUP				0.001	0.134	0.019	<0.02	<0.05
	Dec-93	7.1	11	2,070	0.004	0.261	0.045	<0.02	<0.05
	DUP				0.003	0.207	0.041	<0.02	<0.05

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW8 (Continued)	Mar-94	6.8	9	2,145	0.006	0.146	0.018	<0.02	<0.05
	DUP				0.003	0.134	0.019	<0.02	<0.05
	Jun-94	7.9	10	1,610	<0.005	<0.01	<0.003	<0.03	<0.01
	DUP				<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	7.1	11	1,932	<0.002	0.015	<0.003	0.023	0.01
	DUP				<0.002	<0.002	<0.002	0.013	0.009
	Dec-94	7.0	9	1,931	<0.002	<0.002	<0.002	0.008	0.013
	DUP				<0.002	<0.002	0.003	0.016	0.006
	Apr-95	7.0	9	2,360	<0.002	0.004	0.003	0.016	0.036
	DUP				<0.002	0.004	0.003	0.016	0.085
	Jun-95	7.1	13	2,244	<0.002	0.006	0.009	0.021	0.011
	DUP				<0.002	0.006	0.01	0.021	0.011
	Sep-95	6.8	11	1,950	<0.001	0.003	0.005	0.014	0.016
	DUP				<0.001	0.002	0.004	0.011	0.013
	Dec-95	7.2	8	2,200	0.002	0.025	0.02	0.028	0.01
	DUP				0.003	0.011	0.01	0.018	0.011
	Jun-96	6.8	6.5	2,140	<0.001	0.003	0.004	0.015	0.009
	DUP				<0.001	0.003	0.004	0.016	0.016
	Dec-96	6.9	9.2	2,600	<0.002	<0.003	0.004	<0.011	0.015
	DUP				<0.002	0.003	0.003	0.014	0.008
	Aug-97	6.8	10.6	2,730	<0.01	<0.015	0.009	<0.055	0.019
	DUP				<0.01	<0.015	<0.005	<0.055	0.011
	Dec-97	7.4	9.2	2,310	<0.005	<0.005	0.004	0.014	0.009
	DUP			No duplicate sample collected					
	Jun-98	7.2	10.7	1,970	0.001	0.002	0.001	0.008	0.006
	DUP				0.001	<0.001	<0.001	0.009	0.013
	Dec-98	7.2	10.2	2,490	<0.001	0.001	0.003	0.014	<0.025
	DUP				<0.001	0.002	0.002	0.012	<0.025
	Jun-99	7.4	10	1,490	<0.001	<0.001	<0.001	0.010	<0.025
	DUP				<0.001	<0.001	<0.001	0.010	<0.025
	Dec-99	7.7	7	1,490	<0.00026	0.0018	0.00259	0.009	<0.025
	DUP				<0.0003	0.0030	0.00200	0.008	<0.025
	Jun-00	8.5	11.2	930	0.00090	<0.001	0.00163	0.013	<0.025
	DUP				0.0015	0.0013	0.0032	0.018	<0.025
	Dec-00	7.0	10.7	1,300	<0.00027	<0.001	0.00181	0.006	<0.025
	DUP				0.0004	<0.001	0.00277	0.007	<0.025
	Jun-01	7.2	12.5	1,120	0.0007	<0.001	0.005	0.014	0.005
	DUP				0.0008	<0.001	0.005	0.018	0.01
	Dec-01	6.4	11	1,000	<0.0002	0.001	0.0018	0.004	0.007
	DUP				<0.0002	0.0012	0.0026	0.005	0.043

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW9	Sep-92	7.1	10	1,428	<0.001	0.009	0.004	<0.02	0.013
	Dec-92	7.0	10.3	1,376	<0.001	0.018	0.012	<0.02	0.03
	Mar-93	7.7	8.5	1,595	0.001	0.022	0.02	<0.02	<0.01
	Jun-93	7.3	14	1,536	<0.001	0.005	0.005	0.03	0.02
	Sep-93	7.0	13	1,650	<0.001	0.01	0.004	0.026	<0.05
	Dec-93	7.4	9.5	1,704	0.001	0.013	0.007	<0.02	<0.05
	Mar-94	7.4	11	1,656	0.002	0.014	0.005	<0.02	<0.05
	Jun-94	7.5	14	1,677	<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	7.2	11.5	1,496	<0.002	0.011	<0.002	0.011	0.006
	Dec-94	7.4	10	1,540	<0.002	<0.002	0.002	<0.008	0.005
	Apr-95	7.2	7.5	1,639	<0.002	0.002	<0.002	<0.008	0.033
	Jun-95	7.3	13	1,782	<0.002	0.004	0.007	0.009	0.013
	Sep-95	7.3	11	1,800	<0.001	0.005	0.005	0.01	0.113
	Dec-95	7.4	7.5	1,350	0.002	0.002	<0.002	0.006	0.011
	Jun-96	7.2	12	1,755	<0.001	0.005	0.004	0.016	0.02
	Dec-96	7.1	8	1,930	<0.002	<0.003	<0.001	<0.011	0.019
	Aug-97	7.2	11.7	2,320	<0.01	<0.015	<0.005	<0.055	0.008
	Dec-97	7.6	8.9	2,110	<0.005	<0.005	<0.001	<0.01	0.009
	Jun-98	7.6	13.1	2,220	<0.001	0.001	0.003	0.005	0.011
	Dec-98	7.7	12.1	2,570	<0.001	<0.001	0.001	<0.001	<0.025
	Jun-99	7.5	11.8	1,960	<0.001	<0.001	<0.001	0.008	<0.025
	Dec-99	8.0	7.1	2,210	0.00035	0.0013	0.001222	0.005	<0.025
	Jun-00	5.2	11.3	1,640	0.0004	<0.001	<0.001	0.004	0.0517
	Dec-00	7.6	9.3	1,620	<0.0002	<0.001	<0.001	<0.003	<0.025
	Jun-01	8.2	12.6	1,780	<0.0002	<0.001	0.002	0.004	<0.005
	Dec-01	7.6	10	1,350	<0.0002	<0.001	<0.001	<0.003	0.011
HOL-MW10	Sep-92	7.3	13	1,980	<0.001	0.009	0.005	<0.02	<0.01
	Dec-92	6.9	8.6	1,958	<0.001	0.009	0.047	0.06	0.03
	Mar-93	7.4	6	1,550	0.003	0.036	0.03	<0.02	<0.01
	Jun-93	7.1	13	1,320	<0.001	0.026	0.028	0.03	0.01
	Sep-93	7.1	13.8	1,316	0.001	0.048	0.036	<0.02	<0.05
	Dec-93	7.3	9	1,430	0.002	0.05	0.031	<0.02	<0.05
	Mar-94	7.3	7.5	1,490	0.004	0.033	0.019	0.026	<0.05
	Jun-94	1.1	8	1,838	<0.005	<0.01	0.003	<0.03	<0.01
	Sep-94	7.2	13	1,518	<0.002	<0.002	0.009	0.015	<0.005
	Dec-94	6.9	9	1,573	<0.002	0.009	0.024	0.028	0.02
	Apr-95	7.1	4	1,120	<0.002	0.002	0.011	0.022	<0.005
	Jun-95	7.2	12	1,474	<0.002	0.01	0.025	0.029	0.007
	Sep-95	6.6	13.5	1,700	0.002	0.007	0.01	0.02	<0.01
	Dec-95	7.2	8	1,550	0.003	0.017	0.019	0.031	0.01
	Jun-96	7.4	17.3	1,065	0.001	0.014	0.025	0.041	0.009

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TBMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW10 (Continued)	Dec-96	7.2	8	1,470	<0.002	0.027	0.017	0.035	0.018
	Aug-97	7.1	14.4	1,910	<0.01	<0.015	<0.005	<0.055	0.043
	Dec-97	7.1	8.9	1,530	<0.005	0.009	0.033	0.056	<0.005
	Jun-98	7.4	11.3	1,610	0.004	0.009	0.019	0.061	0.014
	Dec-98	7.3	12.4	1,500	0.007	<0.001	0.003	0.023	<0.025
	Jun-99	7.6	13.1	1,350	0.001	0.001	0.003	0.031	<0.025
	Dec-99	Well Damaged Could Not Be Sampled							
	Jun-00	Well Damaged Could Not Be Sampled							
	Dec-01	7.3	8.0	1,100	0.0003	0.0018	0.0029	0.021	<0.005
HOL-MW11A	Sep-92	7.1	11	1,035	<0.001	0.018	0.006	<0.02	0.013
	Dec-92	7.0	8	1,176	<0.001	0.011	0.005	<0.02	0.04
	Mar-93	7.0	5	1,106	0.003	0.018	0.009	<0.02	<0.01
	Jun-93	7.5	11	897	<0.001	0.033	0.012	0.05	<0.01
	Sep-93	6.9	12.5	1,064	<0.001	0.016	0.002	<0.02	<0.05
	Dec-93	7.5	8.5	1,233	0.001	0.033	0.016	<0.02	<0.05
	Mar-94	7.2	8.5	1,051	<0.001	0.011	<0.001	0.033	<0.05
	Jun-94	Well Casing Bent, Could Not Sample							
	Sep-94	7.2	12	600	<0.002	0.02	<0.002	0.01	<0.005
	Dec-94	7.3	8.5	1,160	<0.002	0.011	0.019	0.026	<0.005
	Apr-95	7.3	4	825	<0.002	0.01	0.002	<0.008	<0.005
	Jun-95	7.8	12	670	<0.002	0.043	0.007	0.012	0.007
	Sep-95	6.8	12	950	0.005	0.019	<0.002	0.002	0.013
	Dec-95	7.2	7	1,280	0.005	0.007	<0.002	0.003	0.01
	Jun-96	7.4	14	590	<0.001	0.041	0.002	0.004	0.011
	Dec-96	7.2	9	1,110	0.002	0.021	0.009	0.012	0.008
	Aug-97	6.9	9.8	1,750	<0.01	0.019	0.012	<0.055	0.025
	Dec-97	6.3	9.1	1,590	<0.005	0.014	0.002	<0.01	<0.005
	Jun-98	7.6	12.5	1,500	<0.001	0.03	0.002	0.008	0.012
	Dec-98	8.3	11.4	2,000	<0.001	0.011	<0.001	0.003	<0.025
	Jun-99	6.7	11.3	1,020	<0.001	0.008	0.002	0.008	<0.025
	Dec-99	6.6	6.6	1,190	<0.0003	0.008	0.003	0.005	<0.025
	Jun-00	7.7	12.8	520	<0.0002	0.0085	0.004	0.004	<0.025
	Dec-00	7.5	10.3	1,070	<0.0002	0.0091	0.00186	0.004	<0.025
	Jun-01	7.1	13.5	970	0.0004	0.009	0.012	0.005	<0.005
	Dec-01	7.5	18	800	<0.0002	0.0074	0.0017	<0.003	<0.005
HOL-MW11B	Sep-92	7.1	9.8	705	<0.001	0.004	0.02	<0.02	0.025
	Dec-92	7.0	7.3	600	<0.001	0.002	0.006	0.02	0.04
	Mar-93	6.8	8.5	725	0.005	0.002	0.011	<0.02	<0.01
	Jun-93	7.1	13	726	0.002	0.004	0.008	0.03	0.01
	Sep-93	6.9	10.9	690	0.001	0.003	0.004	<0.02	<0.05
	Dec-93	7.4	9	686	0.005	0.011	0.04	<0.02	<0.05

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW11B (Continued)	Mar-94	7.1	9	622	0.005	0.022	0.013	<0.02	<0.05
	Jun-94	7.3	14	621	<0.005	0.018	<0.003	<0.03	<0.01
	Sep-94	7.2	10	532	<0.002	<0.002	0.003	<0.008	0.006
	Dec-94	7.1	6	620	<0.002	0.004	0.004	0.012	0.007
	Apr-95	7.4	8	662	<0.002	<0.002	<0.002	<0.008	<0.005
	Jun-95	7.1	13	660	0.003	0.005	0.009	0.01	0.014
	Sep-95	6.4	10	700	0.002	0.005	0.006	0.005	0.119
	Dec-95	7.4	8	590	0.002	0.005	0.003	0.005	0.009
	Jun-96	7.2	14.8	460	<0.001	0.003	0.005	0.005	0.014
	Dec-96	7.2	9	600	<0.002	0.009	0.005	0.012	0.015
	Aug-97	Well Damaged Can Not Sample							
	Dec-97	Well Damaged Can Not Sample							
HOL-MW12	Jun-93	12.9	17	5,664	0.001	0.284	0.454	0.04	0.08
	Sep-93	13.1	11.6	39,440	<0.001	0.012	0.006	0.021	0.07
	Dec-93	13.1	9	35,750	0.001	0.011	0.009	<0.02	0.07
	Mar-94	13.3	9	22,880	0.006	0.013	0.004	0.032	<0.05
	Jun-94	13.9	14.5	33,390	<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94	12.3	15	32,500	<0.002	<0.002	0.04	0.028	0.404
	Dec-94	13.9	9	31,460	<0.002	<0.002	0.02	0.029	0.178
	Apr-95	13.4	10	29,400	<0.002	0.002	<0.002	0.027	0.027
	Jun-95	13.9	16	43,560	<0.002	<0.002	0.004	0.028	0.201
	Sep-95	13.5	10.5	44,000	0.002	0.001	0.003	0.026	0.31
	Dec-95	>13	6.5	27,500	<0.002	0.007	0.008	0.029	0.073
	Jun-96	>13	15	36,900	<0.001	<0.001	<0.005	0.022	0.087
	Dec-96	>13	8.2	48,200	<0.002	<0.003	<0.004	0.028	0.018
	Aug-97	>13	12	46,300	<0.01	<0.015	<0.005	<0.055	0.149
	Dec-97	>13	8.9	43,600	<0.005	<0.005	<0.001	<0.01	0.027
	Jun-98	>13	13.8	53,300	<0.001	<0.001	<0.001	0.022	0.066
	Dec-98	7.2	10.5	53,700	<0.001	0.002	0.006	0.034	0.2
	Jun-99	13.4	12	47,000	<0.001	<0.001	<0.001	0.022	0.379
	Dec-99	12.2	7.1	47,500	0.002	0.018	0.001	0.027	<0.25
	Jun-00	12.4	12.2	14,300	0.0004	<0.001	<0.001	0.023	<0.25
	Dec-00	>13	6.7	35,900	0.0005	0.0015	<0.001	0.027	<0.125
	Jun-01	13.7	14.6	30,400	0.002	<0.001	<0.001	0.029	0.07
	Dec-01	13.7	12	21,500	0.0002	<0.001	<0.001	0.02	0.038
HOL-MW13	Jun-93	9.1	15	2,063	<0.001	0.022	0.039	0.05	0.02
	Sep-93	11.9	10.1	3,640	0.001	0.024	0.022	<0.02	<0.05
	Dec-93	9.7	11	1,656	<0.001	0.023	0.027	0.03	0.07
	Mar-94	9.0	9	1,573	0.005	0.03	0.034	<0.02	<0.05
	Jun-94	4.0	12	1,286	<0.005	<0.01	<0.003	<0.03	0.17
	Sep-94	8.8	13	1,452	<0.002	0.008	0.026	0.014	0.005

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Holcim (US) Inc.
West Quarry Remediation Site
Mason City, Iowa

WELL NUMBER AND DATE SAMPLED		FIELD PARAMETERS			LABORATORY PARAMETERS				
		pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS		6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS
HOL-MW13 (Continued)	Dec-94	8.5	7	1,359	<0.002	<0.002	0.011	0.021	0.007
	Apr-95	7.7	10	1,050	<0.002	0.006	0.019	0.017	<0.005
	Jun-95	8.0	19	1,074	<0.002	0.002	0.004	0.011	0.016
	Sep-95	8.5	10	1,100	<0.001	0.003	0.004	0.008	0.017
	Dec-95	8.2	6	1,120	<0.002	<0.002	0.002	0.006	0.005
	Jun-96	7.9	13.5	1,170	<0.001	0.005	0.008	0.027	0.022
	Dec-96	8.0	7.6	1,100	<0.002	<0.003	0.006	0.013	0.011
	Aug-97	7.3	12	1,420	<0.01	<0.015	<0.005	<0.055	0.019
	Dec-97	7.1	7.8	1,380	<0.005	<0.005	0.01	<0.01	<0.005
	Jun-98	7.5	10.8	1,430	0.001	<0.001	<0.001	0.009	0.023
	Dec-98	8.2	10	2,170	<0.001	0.005	<0.001	0.005	<0.025
	Jun-99	8.1	11.1	1,120	<0.001	0.001	<0.001	0.008	<0.025
	Dec-99	8.4	7.1	1,680	<0.0003	0.006	<0.001	0.003	<0.025
	Jun-00	8.1	11.3	920	<0.0002	<0.001	<0.001	<0.003	<0.025
	Dec-00	7.7	9.2	960	<0.0002	<0.001	0.00274	0.005	<0.025
	Jun-01	7.1	12.3	900	<0.0002	<0.001	0.003	0.005	<0.005
	Dec-01	8.1	13	650	<0.0002	<0.001	<0.001	<0.003	<0.005
FIELD BLANK	Sep-92				<0.001	0.002	0.003	<0.02	0.013
	Dec-92				0.001	<0.001	0.007	<0.02	<0.01
	Mar-93				0.001	<0.001	0.005	<0.02	<0.01
	Jun-93				<0.001	0.002	0.002	<0.02	0.01
	Sep-93				<0.001	<0.001	0.003	<0.02	<0.05
	Dec-93				<0.001	<0.001	<0.001	0.03	<0.05
	Mar-94				<0.001	0.001	<0.001	0.024	<0.05
	Jun-94				<0.005	<0.01	<0.003	<0.03	<0.01
	Sep-94				<0.002	0.002	<0.002	<0.008	0.008
	Dec-94				<0.002	0.003	<0.002	<0.008	<0.005
	Apr-95				<0.002	<0.002	<0.002	<0.008	0.048
	Jun-95				<0.002	<0.002	0.005	<0.008	<0.005
	Sep-95				<0.001	<0.001	<0.002	<0.001	<0.01
	Dec-95				0.012	<0.001	0.002	<0.001	0.011
	Jun-96				<0.001	<0.001	<0.001	<0.001	0.011
	Jun-99				<0.001	0.001	<0.001	<0.005	<0.025
	Dec-99				<0.0003	0.001	<0.001	<0.003	<0.025
	Jun-00				<0.0002	<0.001	<0.001	<0.003	<0.025
	Dec-00				<0.0002	<0.001	<0.001	<0.003	<0.025
	Jun-01				<0.0002	<0.001	<0.001	<0.003	<0.005
	Dec-01				<0.0002	<0.001	<0.001	<0.003	0.005

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
 Holcim (US) Inc.
 West Quarry Remediation Site
 Mason City, Iowa

WELL NUMBER AND DATE SAMPLED	FIELD PARAMETERS			LABORATORY PARAMETERS				
	pH (units)	TEMP (Celsius)	CONDUCTIVITY (umhos/cm @ 25° C)	CADMIUM (mg/l)	CHROMIUM (mg/l)	LEAD (mg/l)	NICKEL (mg/l)	PHENOLS (mg/l)
PERFORMANCE STANDARDS	6.5 TO 8.5	NPS	NPS	0.005	0.05	0.05	0.2	NPS

Notes:

1. Groundwater samples were collected by GZA GeoEnvironmental, Inc. on the dates indicated.
2. Field parameters were measured by GZA during the sampling. Conductivity values were corrected for temperature and are reported in micromhos per centimeter (umhos/cm) at 25 degrees Celsius.
3. Laboratory parameters were analyzed by Suburban Laboratories, Inc. of Waukesha, Wisconsin for the Sep-92 through Mar-94 sampling events and by IEA, Inc. (also known as AEN) of Schaumburg, Illinois for the Jun-94 through Dec-97 sampling events. AEN became Severn Trent Laboratories of Monroe, Connecticut and analyzed the Jun-98 samples. The Dec-98 through Dec-01 samples were analyzed by USFilter/Enviroscan of Rothschild, Wisconsin.
4. Cadmium, chromium, lead, nickel and phenols analytical results are reported in milligrams per liter (mg/l). "<" indicates that the parameter was not detected above the method detection limit specified in the June 1992 Quality Assurance Project Plan.
5. The groundwater samples were not field filtered. As such, the reported concentrations are not considered to represent dissolved concentrations.
6. The performance standards (PS) are included in the June 1992 Quality Assurance Project Plan. "NPS" indicates that no PS was established.
7. Shaded results indicate concentrations that exceed the performance standard.

Attachment 8

MEMORANDUM

DATE: May 13, 2002

FROM: Victor Walkenhorst, SEE Program/MOKS Branch

TO: Diana Engeman, RPM/IANE Branch
Glenn Curtis, Chief, Iane Branch
Steve Kovac, Chief, MOKS Branch

SUBJECT: Site Inspection at Holcim(US)(Formerly Northwestern States Portland Cement Co.)
West Quarry Remediation Site, Mason City, Iowa

Diana Engeman, RPM, scheduled a site inspection visit for Victor Walkenhorst, SEE Program, with Cindy Garza, Environmental Engineer, Holcim (US). The purpose of the site visit was to comply with requirements of the second Five Year Review for the subject site. The site review was conducted on April 25, 2002.

I met with Cindy Garza and Steve Molstad, Charleson Excavators at the Holcim(US) office in Mason City, Iowa. Steve Molstad has been contracted by Holcim(US) to provide maintenance at the West Quarry Remediation Site. Steve Molstad provided transportation to the West Quarry Remediation Site for the site inspection.

The site is on Holcim(US) plant property and the site was a former rock quarry that after rock, suitable for cement production had been removed, was then utilized as dump area and filled with cement kiln dust(CKD) material that is a residue of the cement making process. At the present time the cement making process at the Holcim(US) plant does not create a CKD residue.

At the West Quarry Remediation Site there is an east-west plant road on the north portion of the site that is utilized for heavy duty plant truck traffic. The cap was constructed on both sides of this east-west road. There is no exposed CKD or clay cap at the road. There also is a north-south service road on the east side of the cap which provides access to the Treatment Building, the Settlement Pond, and the Retention Pond on the east side of the cap. This road was constructed on the clay cap and CKD is not exposed at this road.

The cap at the West Quarry Remediation site slopes from north to south to the south end of the cap at the railroad embankment. The surface water flow at the railroad embankment is from west to east into the Retention Pond at the southeast portion of the site.

The seeded grass slope of the cap surface does not show any evidence of erosion paths from surface water drainage. Cindy Garza and Steve Molstad stated that repairs required for areas washed out due to heavy surface drainage have been minimal for the past years and surface drainage that did show erosion paths were repaired and re-seeded as soon possible, weather

permitting.

During 2001, at the southeast portion of the West Quarry Remediation Site the rock face at the perimeter of the cap at the Retention Pond had been improved and reinforced with additional rock to prevent damage to the cap at the edge of the Retention Pond. During 2002 Holcim(US) will be installing a stationary groundwater extraction pump with an automatic high water level switch to control the water level in the Retention Pond. This will replace the existing extraction pump, with a manual on-off switch, located on a floating platform in the Retention Pond.

Also during 2001 Holcim(US) had a partially submerged gravel accessway constructed in the Settling Pond located adjacent to the treatment plant. This provided access for excavating equipment to remove sediment from the settling basin without disturbing the clay cap at the bottom of the settling basin. During 2002 the rock face at the sidewalls will also be improved.

On completion of the site inspection of the West Quarry Remediation Site, we returned to the office building to discuss the cap maintenance program and review the computer program that controls the level of the groundwater at the West Quarry Remediation Site. Cindy Garza then explained and demonstrated the computer program that controls the extraction wells on this site.

The computer program shows a section through the cap area at each extraction well pump and the program indicates the level of the groundwater below the bottom of the clay cap at each of the extraction wells. The computer program allows the program operator remote control of the on-off operation of each of the extraction wells and thereby also allows the operator to adjust the elevation of these switches for complete control of the pumping activity at each extraction well.

The cap vegetation at the West Quarry Remediation Site is well maintained by mowing at least once each year and the application of fertilizer and weed killer is made as required to maintain weed free vegetation growth. Steve Molstad commented that since the present maintenance program has been utilized on the capped quarry area, they have not had to make major repairs to the cap vegetation due to erosion caused by surface water runoff.

At the completion of our discussion Paul Stewart, Plant Manager, stopped by Cindy's office to welcome us and to obtain a brief status of the condition of the cap. I commented that the on going maintenance program on the clay cap was very good and there were no adverse comments on the maintenance and operation programs at the capped sites. Paul Stewart commented that they appreciated our interest and time to review the capped sites.

This completed the site inspection of the West Quarry Remediation Site capped CKD area at Holcim(US), Mason City, Iowa facility.